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High Temperature High Pressure Logging System (HTPLog)

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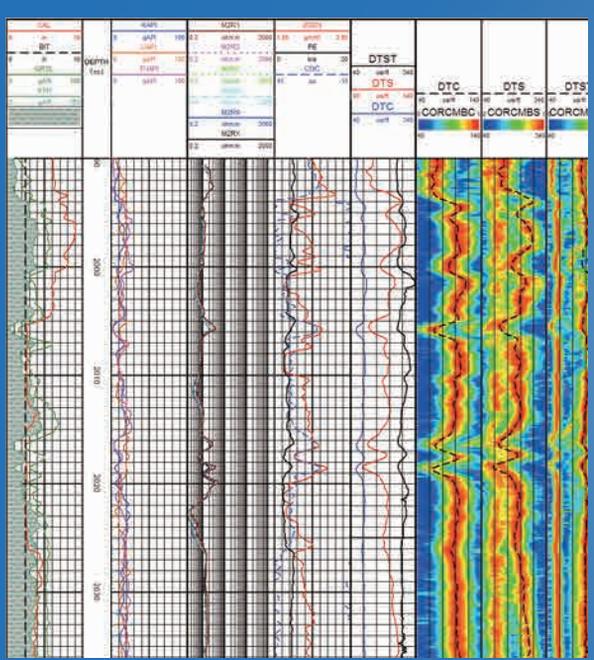

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High Temperature High Pressure Logging System (HTPLog)

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HTPLog Introduction

High Temperature High Pressure Logging (HTPLog) instruments are fully competent of work continuously and stably for 8 hours under the harsh environment of 400°F (200°C) and 160 MPa, to fulfill requirement of perform logging operations under tough situation while obtaining high-quality logging data. Toolstring could be run in 4.5 in. hole with ZDT-HB & MSF-SH, all of the downhole tools are Anti-H_2S designed.

Downhole Tools

Temperature/Tension/Mud Resistivity Tool (TTR)
High Temprature Telemetry/Spectralog Tool (TST-H)
Orientation Tool-B (ORT-B)
Compensated Neutron Tool (CNT)
Litho-Density Logging Tool-B (ZDT-B)
Acoustic Tool (ACT)
Dual Lateral log Tool-Slim Hostile (DLT-SH)
Micro Spherical Focused Laterolog Tool-Slim Hostile (MSF-SH)
Array Induction Tool (AIT)
Hexapod Arms Caliper-Hostile (HAC-H)

Optional Tools

Litho-Density Logging Tool-HB (ZDT-HB)
Electric Decentralizer Sub-Hostile (EDS-H)
Multipole Array Acoustic Tool (MAA-H)
High-Resolution Array Laterolog Tool (ALT-H)

Auxiliary Tools Introduction

Auxiliary tools can be selected according to clients requirements and actual borehole conditions.

EDS (Motor Type) is an electric decentralizer and pad force can be adjustable during the logging, which supply higher safety performance and not affected by the borehole size.

DCS (Mechanical Type) is an inline decentralizer and capable to work for long time under high temperature environment without being affected by temperature.

Both are instead the conventional bow spring device for CNT tool and can run in the 4.5 in. borehole.

Auxiliary Tools

Casing Collar Locator (CCL)
Decentralizer Sub (DCS)
Swivel Sub (SWS)
Mass Isolator Sub (MIS)
Four Arms Centralizer Sub (FCS)
Single Knuckle Joint (SKJ)
Double Knuckle Joint (DKJ)
Flex Joint Sub (FJS)
Insulation Sub (ISS-SH)
Hole Finder Sub (HFS)
Flywheels Centralizer Sub (FWC)

PI Data Acquisition System (PIDAS)

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Features

- The system records the data including the original signal of the instrument, calibrated engineering value and the processed data. Because the original signal of the instrument is recorded, the logging data could be reprocessed by different parameters if required.
- All of the calibration value and verification value could be displayed by the operator, therefore, it is easy to confirm: the value of the super-value will flash, causing the operator's attention.
- Repeated curves can be real-time displayed on the main logging curves to verify the repeatability of the curves.
- Real-time plotting of cross-plot graphs allows the operator to verify the correctness of the logging response which is based on the expected model.
- Real-time environmental correction eliminates the subjective assessment of the operator's quality control process.
- Real-time similarity correction verifies the integrity of the acoustic waveform data.
- Using personnel safety and data protection systems.
- Reduces wellsite operating time and ensure system reliability by using advanced computer technology and redundant design simplify data acquisition and processing.

* Telemetry :

MGTS
SGTS
RGTS

Wireline Perforating Panel (WPP)

Features

- Wide voltage input (100 Vac-240 Vac)
- With safety switch
- PFC power supply is up to 150 V, and perforating and coring power supply adopts the mode of external DC power supply
- The polarity of perforating and coring voltage is adjustable

Introduction

The PI Data Acquisition System (PIDAS) is designed for data acquisition and processing in combination with Open-hole and Cased Hole tool. This PIDAS is based on portable notebook as a host and remote transmission system with high-speed data communication.

Specifications

Physical Dimensions & Weights	
Height	29.13 in. (740 mm)
Depth	29.33 in. (745 mm)
Width	27.56 in. (700 mm)
Shipping Weight	160.9 lbs. (73 kg)
Environmental Characteristics	
Operating Temperature	0°C~+50°C
Storage Temperature	-20°C~+75°C
Relative Humidity	＜95%
Vibration (3D)	3 g 10-60 Hz (When not working)
Shock (3D)	3 g 10-60 Hz (When not working)
System Power Supply	85-265 Vac, 43 Hz-70 Hz
Downhole Instrument Power Supply	
AC Power	0-720 Vac, 2 A, 1440 W
	0-1440 Vac, 1 A, 1440 W
DC Power	0-1000 Vdc, 2 A, 2000 W

System Composition

Portable surface logging system is divided into: data acquisition system, power supply system and other major parts. The functions of each part is as follows:

1. Surface Data Acquisition System: the computer is the core, controlled by several loaded software, to complete a variety of logging operations. Such as the processing, recording, display, quality control and fast processing and interpretation of logging data on the wellsite. Including: PC, Wireline Acquisition Panel (WAP).
2. Power Supply System provides power to the surface system and downhole equipment. Currently, logging power supply system usually use vehicle generators or wellsite power.
3. Hoist Display Unit (HDU) is the display unit for the Surface System. Equipped with a color LCD touch screen display, the unit provides a continuous display of depth information. In addition, HDU also displays other variables monitored and provides a visual and audible alarm when any of these variables are outside a preset range.

Features

- Used for a variety of downhole instruments for openhole and cased hole with different modules.

  PI Data Acquisition System (PIDAS)

  Post-processing & presentation management (FileView)

  PI Wireline Formation Sampling and Testing System (PIWST)
  - ·PI Formation Coring Software (PIWST-FCT)
  - ·PI Mechanical Sidewall Coring Software (PIWST-MSC)
  - ·PI Reservoir Characterization Tester Software (PIWST-RCT)
  - ·PI Formation Test, Fluid Analysis, Pump-Thru Software (PIWST-FFP)

  PI Production and Engineering Logging System (PIPES)
  - ·PI Down Hole Camera Software (PIPES-DHC)
  - ·PI Free Point Indicator Software (PIPES-FPI)
  - ·PI Mechanical Downhole Cutter (PIPES-MDC)
  - ·PI Rotary Magnet Ranging Software (PIPES-RMR)
  - ·PI Gyroscope Orientation Software (PIPES-GOT)
  - ·PI Downhole Casing & Tubing Tractor Software (PIPES-CTT)
  - ·PI Downhole Hydraulic Tractor Software (PIPES-DHT)
  - ·PI MFI Logging System (PIPES-MFI)
  - ·PI Memory Acquisition and Processing Software (PIPES-MAP)

  PI Vertical Seismic Profile System (PIVSP)

  Microseismic monitoring data processing and interpretation software (MMDPI)

  PI Logging While Drilling System (PILWD)
  - ·PI Rotary Steerable Software
  - ·PI LWD Data Presentation Software
  - ·PI LWD Remote Monitoring Software
- Using multi-window to display nuclear logging equipment which is obtained by the spectrum, acoustic and imaging instruments. These windows can be controlled by the user, in order to display the original data or the processed data, so that, the operator can control the quality of the real-time logging data.
- Provides Multi-tasking and distributed processing at the wellsite, improving log data integrity and wellsite efficiency.

PIDAS Software Introduction

The PIDASView software contains two parts: PIDAS software and FileView software. Each part can run independently.

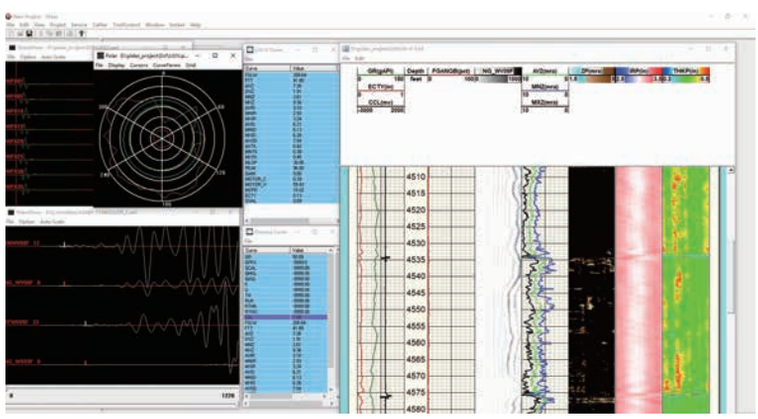
The PIDAS software is a control acquisition processing system based on WINDOWS with multi-task & multi-user, and using a large number of modern image processing technology.

The control acquisition processing system is used to acquire and process various signals of the downhole logging instrument detectorand to control other functions of the downhole instrumentand converts the acquired signals to engineering values and provides the logging data required by the user.

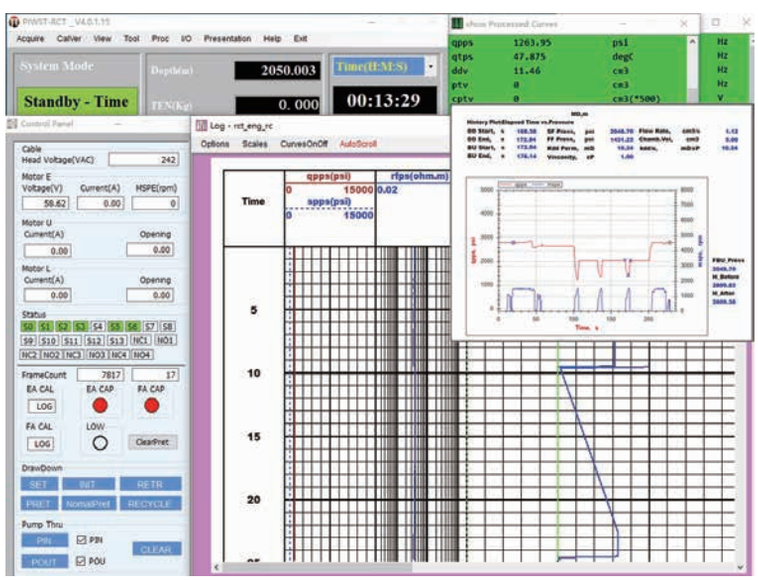
By equipment array, imaging and large information, real-time logging data acquisition, control and processing achieve multi-parameter acquisition and multi-task time-sharing processing.

PIDAS software can be used for a variety of downhole instruments for openhole and cased hole with different modules.

The FileView is a post-processing and presentation software. It can support the basic functions, such as the heading, toolstring, well sketch, calibration, parameters, log plot, data convert, etc. Also, it can provide the data analysis and processing, 2D, 3D, cross plot, compose plot, etc. advanced functions.



USI-G/CBL/VDL service by PI Data Acquisition System module



Pressure Test and Sampling service by PI Reservoir Characterization Tester Software PIWST-RCT module

Wireline Perforating Panel (WPP)

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Features

- Equipped with a safety switch to ensure safe operation.
- Power supply to GR and CCL instruments, the voltage is up to 160 Vdc.
- Adjust the polarity of the power supply
- Both hands must be used simultaneously for perforation and coring to ensure the safety of the operation.
- Using an external DC power supply, the perforation voltage and current no limited by this panel.
- With BYPASS mode, connected with any system.
- Perforation and coring functions, no more panels required.
- Provide a powerless CCL visual indication and signal conditioning

Introduction

Wireline Perforating Panel (WPP) is used for Perforating Control, Coring Control, PFC (Perforating Formation Correlation) power supply for Gamma Ray and CCL, Powerless CCL. It is the first panel connected to the cable drums, and suitable for 7-Conductor and Mono-conductor cable.

Specifications

Physical Specifications	
Length	17.7.00 in. (45 cm)
Width	19 in. (48.26 cm)
Height	5.3 in. (13.35 cm)
Weight	22.05 lbs. (10 kg)
Electrical Parameters	
AC Input	100-265 Vac / 47-63 Hz
PFC Output Voltage	0-160 Vdc
Environmental Specifications	
Operating Temperature Range	32°F (0°C) to 104°F (+40°C)
Storage Temperature Range	-4°F (-20°C) to 158°F (+70°C)
Maximum Humidity	95%

Temperature/Tension/Mud Resistivity Tool (TTR)

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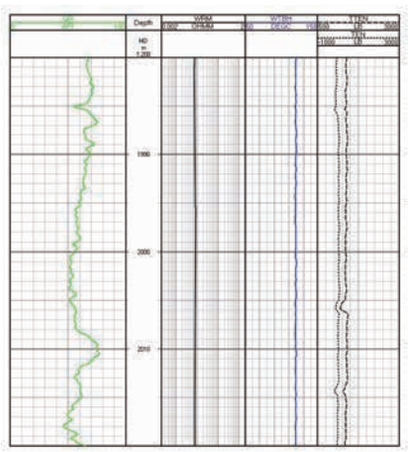
Applications

- Borehole temperature measurement.
- Mud resistivity measurement.
- Tension and compression forces measurement.



Introduction

The TTR contains three type sensors for measurement of cablehead tension/compression force, borehole temperature, and mud resistivity.
TTR does not contain any electronics, and it is supported by TST-H which contains the electronic part of TTR.

Specifications

Maximum Temperature	400°F (200°C)＞36 hours
Maximum Pressure	23000 psi (160 MPa)
Minimum Hole Diameter	4.50 in. (114.5 mm)
Tool Diameter	3.625 in. (92 mm)
Make-up Length	3 ft.-7.7 in. (1.11 m)
Shipping Length	4 ft.-11.8 in. (1.52 m)
Weight	80 lbs. (36.29 kg)
Maximum Logging Speed	100 ft./min (30 m/min)
Measurement Range:	
Cablehead Tension	0 to 12,000 lbs. Tension
	0 to 10,000 lbs. Compression
Borehole Temperature	32°F to 446°F (0°C to 230°C)
Mud Resistivity	0.01 ohmm to 10 ohmm
Absolute Accuracy:	
Cablehead Tension	± 800 lbs. Tension ± 5%
	± 800 lbs. Compression ± 5%
Differential Cablehead Tension	± 100 lbs. Tension
	± 100 lbs. Compression
Borehole Temperature	± 4°F ± 5% (2°C ± 5%)
Mud Resistivity	0.01 ohmm ± 5%
Repeatability:	
Cablehead Tension	± 100 lbs. Tension
	± 100 lbs. Compression
Borehole Temperature	± 2°C
Mud Resistivity	± 0.01 ohmm
Maximum Tensile Force	37,000 lbs.
Maximum Compressive Force	78,000 lbs.

High Temprature Telemetry/Spectralog Tool (TST-H)

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Applications

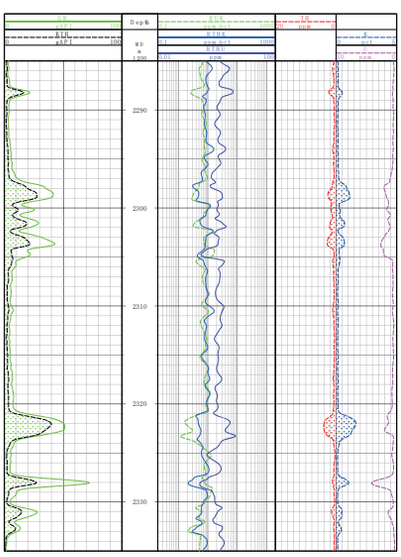
- Depth correction
- Formation evaluation and lithology identification in Extreme High pressure and temperature environment
- Pipe-conveyed logging

Features

- MGTS Telemetry System

Benefits

- Work continuously and stably for long life under the harsh environment of 400°F (200°C)



Introduction

TST-H is is fully competent of work continuously under the harsh environment of 400°F (200°C). TST-H acquires data and communicates between downhole tools and surface system. It meaures temperature/tension/ mud resistivity data from TTR to surface system at the same time. It also measures natural gamma-ray and digital spectralog.

Specifications

Maximum Temperature	400°F (200°C) ＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Minimum Hole Diameter	4.50 in. (114.5 mm)
Tool Diameter	3.75 in. (95 mm)
Make-up Length	9 ft.-0.27 in. (2.75 m)
Shipping Length	10 ft.-5.6 in. (3.19 m)
Weight	132.3 lbs. (60 kg)
Power Requirements	180 Vac/80 mA (cablehead)
Maximum Logging Speed	30 ft./mim (9 m/min)
Transmission Mode	M2 & M5 & M7
Transmission Rate:	
M2	20.83 kbps (send command)
	41.66 kbps (send data)
M5	93.75 kbps
M7	93.75 kbps
Maximum Tensile Force	78,000 lbs. (35,381 kg)
Maximum Compressive Force	78,000 lbs. (35,381 kg)
Gamma Ray:	
Accuracy	GR: ±3% of measured value
Gamma Ray Energy Range	0.06 to 3.5 MeV
Measure Point	1 ft.-7.2 in. (490 mm) from bottom of sub
Spectralog:	
Measuring Range	0.04 to 3.5 MeV
Maximum Measureable	Gamma Ray 2500 API
Quantity	Potassium 100 percent
	Uranium 250 ppm
	Thorium 700 ppm
Accuracy	K, U, & Th: ±4% of measured value
	(accuracy compares measured values with true values)
	Precision for standard shale)
at 10 ft./min (3 m/min)	K: 2 ± 0.15 percent
	U: 6 ± 0.51 ppm
	Th: 12 ± 1.03 ppm
at 30 ft./min (9 m/min)	K: 2 ± 0.26 percent
	U: 6 ± 0.88 ppm
	Th: 12 ± 1.78 ppm
Gamma Ray Energy Range	0.06 to 3.5 MeV
Number of Energy Channels	256
Measure Point	1 ft.-7.2 in. (490 mm) from bottom of sub

Telemetry/Spectrolog Tool-Hostile Longtime (TST-HL)

Geo-Vista

Applications

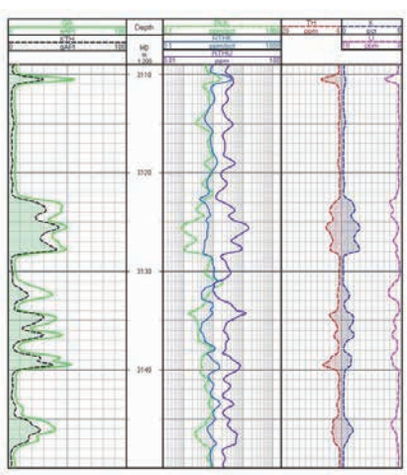
- Formation evaluation and lithology identification in Extreme High pressure and temperature environment
- Pipe-conveyed logging

Features

- Thermostatic regulation of the internal temperature of the instrument

Benefits

- Work continuously and stably for long life under the harsh environment of 400°F (200°C)



Introduction

TST-HL is thermostatic regulation tool, it is fully competent of work continuously and stably for 36 hours under the harsh environment of 400°F (200°C), in high temperature environment, TST-HL needs continuous supply power to achieve the effect of cooling.

TST-HL acquires data and communicates between downhole tools and surface system. It transmits downhole temperature/tension/ mud resistivity data to surface system at the same time. It also measures natural gamma-ray and digital spectralog.

Specifications

Maximum Temperature	400°F (200°C) ＞36 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Minimum Hole Diameter	4.50 in. (114.5 mm)
Tool Diameter	3.75 in. (95.2 mm)
Make-up Length	10 ft.-4.96 in. (3.174 m)
Shipping Length	11 ft.-9.44 in. (3.592 m)
Weight	132.3 lbs. (60 kg)
Power Requirements	180 Vac/80 mA (cablehead)
Maximum Logging Speed	30 ft./mim (9 m/min)
Transmission Mode	M2 & M5 & M7
Transmission Rate:	
M2	20.83 kbps (send command)
	41.66 kbps (send data)
M5	93.75 kbps
M7	93.75 kbps
Maximum Tensile Force	78,000 lbs. (35,381 kg)
Maximum Compressive Force	78,000 lbs. (35,381 kg)
Gamma Ray:	
Accuracy	GR: ±3% of measured value
Gamma Ray Energy Range	0.06 to 3.5 MeV
Measure Point	1 ft.-7.2 in. (490 mm) from bottom of sub
Spectralog:	
Measuring Range	0.04 to 3.5 MeV
Typical Oil Well Potassium	0 to 20%
K, U,Th concentrations	Uranium 0 to 300 ppm
	Thorium 0 to 300 ppm
Maximum Measureable	Gamma Ray 2500 API
Quantity	Potassium 100 percent
	Uranium 250 ppm
	Thorium 700 ppm
Accuracy	K, U, & Th: ±4% of measured value
	(accuracy compares measured values with true values)
Precision for standard shale	
at 10 ft./min (3 m/min)	K: 2 ± 0.15 percent
	U: 6 ± 0.51 ppm
	Th: 12 ± 1.03 ppm
at 30 ft./min (9 m/min)	K: 2 ± 0.26 percent
	U: 6 ± 0.88 ppm
	Th: 12 ± 1.78 ppm
Gamma Ray Energy Range	0.06 to 3.5 MeV
Number of Energy Channels	256
Measure Point	1 ft.-7.2 in. (490 mm) from bottom of sub

Orientation Tool-B (ORT-B)

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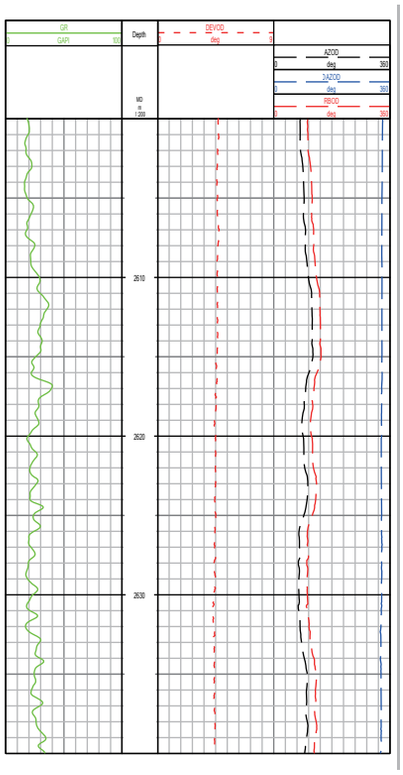
Applications

- Identify the direction of the wellbore
- Identify the relative bearing of the instrument



Introduction

The Orientation Tool is an orientation measurement device which provides information about the toolstring rotational angle, direction and acceleration. By proper interpretation, this information can be used to produce a directional survey of the well, to orient other log data with respect to the wellbore and/or magnetic north, and to correct other log data for "stick and pull" conditions.

Specifications

Maximum Temperature	400°F (200°C) ＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Length	10 ft. 9.92 in. (3.3 m)
Weight	118 lbs. (53.6 kg)
Diameter	3.625 in. (92 mm)
Maximum Logging Speed	125 ft./min (38.1 m/min)
Data Transmission	MGTS
Log Presentation	Standard API linear
Sensor Accuracy	
Azimuth	± 1.5 degrees
Deviation	± 0.25 degrees
Drift Azimuth	Deviation range 9° to 90° DAZ ± 1.5 degrees
	Deviation range 5° to 9° DAZ ± 6.0 degrees
	Deviation range 1° to 5° DAZ ± 10.0 degrees
Maximum Compressive Force	78,000 lbs. (35,381 kg)
Maximum Tensile Force	38,000 lbs. (17,237 kg)

Compensated Neutron Tool (CNT)

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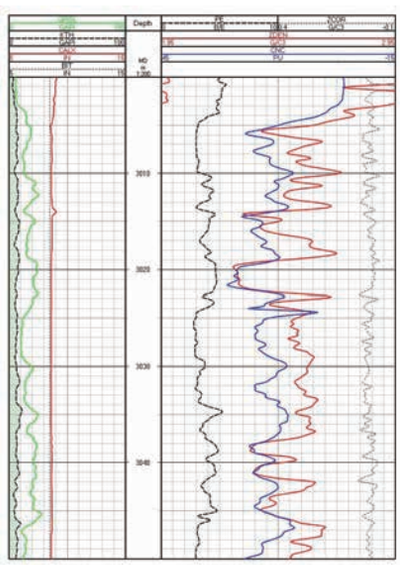
Applications

- Porosity determination
- Lithology identification
- Gas detection
- Correlation in cased wells



Introduction

The Compensated Neutron tool is a radiation logging device used to indicate formation porosity in open or cased boreholes. Two thermal neutron detectors are positioned at different spacings from an 18-Curies, Americium 241-Beryllium 9 (Am/Be) neutron source. The near detector is referred to as the "short-spaced" (SS) detector. The far detector is referred to as the "long-spaced" (LS) detector.

Specifications

Maximum Temperature	400°F (200°C) ＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Diameter	3.625 in. (92 mm)
Maximum Hole Diameter	24 in. (609.6 mm) (Influenced by decentralizer)
Minimum Hole Diameter	4.75 in. (120.6 mm)
Make-up Length	7 ft.-7.34 in. (2.32 m)
Shipping Length	8 ft.-9.25 in. (2.673 m)
Weight	150 lbs. (68.0 kg)
Maximum Logging Speed	30 ft./min (9.0 m/min)
Typical Logging Speed	18 ft./min (6.0 m/min)
Measuring Range	-3 to 100 Limestone Porosity Units (p.u.)
Accuracy	± 0.5 p.u. below 7 p.u. porosity ± 7% of recorded value above 7 p.u. porosity
Repeatability	± 1.5 p.u. @ 15% Limestone porosity
Depth of Investigation	12 in. (304.8 mm)
Radial resolution	N/A
Vertical Resolution	28 in. (711.2 mm) given proper formation contrast above and below zone of interest
Measure Point	Short Spacing: 2 ft.-1.0 in. (635.0 mm) Long Spacing: 2 ft.-6.0 in. (762.0 mm) (both measurements are from the bottom of tool)
Maximum Tension Force	122,000 lbs.
Maximum Compression Force	78,000 lbs.
Wireline Requirements	7-Conductor Cable
Operating Voltage & Current	180 Vac @ 65 mA, approx.
Detector or Sensor Type	Proportional counter
Source Type	Am 241-Be 9
Source Strength	18 Curies-4.5 MeV Neutrons

Litho-Density Logging Tool-B (ZDT-B)

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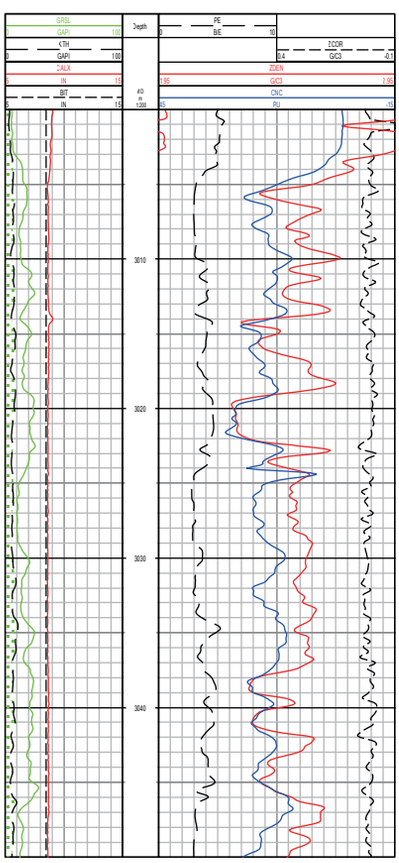
Applications

Scintillation detectors for increased count rate and improved repeatability.

256 channel spectrum recording on LS detectors for advanced signal processing.

Real-time gain compensation for temperature-related changes in detector response.

Compensation of bulk density for variable mud-cake composition and thickness.



Introduction

The Litho-Density Logging Tool measures both formation bulk density (ρ) and the photoelectric absorption index (Pe). These measurements allow evaluation of complex formations through advanced lithology and porosity determination techniques.
ZDT-B tool have update section from ZDT-HL-EA, which was electronic part that make ZDT-B tool overcome harsh environment and working long life.

Specifications

Maximum Temperature	400°F (200°C)＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Makeup Length	18 ft.-8.89 in. (5.63 m)
Shipping Length	19 ft.-11.8 in. (6.09 m)
Weight	365 lbs. (165.6 kg)
Tool Diameter	4.88 in. (123.8 mm)
Minimum Hole Size	6.0 in. (152.4 mm)
Maximum Hole Size	22 in. (558.8 mm)
Maximum Logging Speed	30 ft./min. (9 m/min)
Recommend Logging Speed	<30 ft./min. (9 m/min)
Maximum RIH	300 ft./min. (91.4 m/min)
Maximum POOH	300 ft./min. (91.4 m/min)
Tool Positioning	Decentralized
Source Type	2.5 Curies Cesium 137
Sensor Type	Scintillation
Sampling Rate	2, 4 or 8 spf
Communication / modes	2 and 5 (Normal) or 2 and 7
Telemetry System	MGTS
Combinability	All MGTS instruments
Measurement Range	1.3-3.0 g/cc
Principle	Bulk Density and Pe
Vertical Resolution (90%)	19.0 in. given proper formation contrast above and below zone of interest
Depth of Investigation	8.0 in. water filled borehole with a nominal 20% porosity formation
Accuracy	Density: ± 0.025 g/cc (2.0 - 3.0 g/cc) Pe: ± 0.2 B/e (1.3 to 6 B/e) Caliper: ± 0.3 in. (6 to 16 in.)
Repeatability	Density: ± 0.015 g/cc (2.0 to 3.0 g/cc) Pe: ± 0.2 B/e (absence of mudcake) Caliper: ± 0.3 in. (6 to 16 in.)
Wireline Requirements	7-Conductor Cable
Power Requirements	180 Vac @ 40 mA , Motoring 110 Vdc @ 200 mA (Typical Minimum) Maximum 350 mA before close limit switch opens
Maximum Tension Force	78,000 lbs. (35,380 kg)
Maximum Compression Force	74,500 lbs. (33,792 kg) buckling unsupported

Litho-Density Logging Tool-HB (ZDT-HB)

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Applications

- Formation porosity and lithology
- Formation Minerals
- Gas zones
- Fluid properties

Introduction

The outside diameter of ZDT-HB is 96 mm, which can be used in 4.5 in. wellbore. And radioactive source is the same as conventional density radioactive sources.
ZDT-HB measures formation bulk density (ρ), photoelectric absorption index (Pe) and wellbore diameter. Density data is used to calculate porosity and determine lithology. ZDT-HB includes two detectors. The detector inside the magnetic shielding shell has high measurement stability. ZDT-HB records the pulse height and gamma ray spectrum of the long distance detector.

Specifications

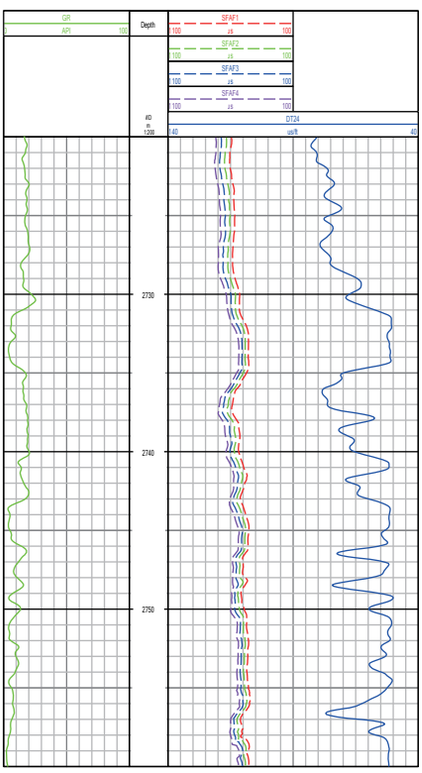
Maximum Temperature	400°F (200°C)＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Tool Diameter	3.78 in. (96 mm)
Minimum Hole Diameter	4.5 in. (114.3 mm)
Maximum Hole Diameter	17.5 in. (444.5 mm)
Make-up Length	13.37 ft.-160.44 in. (4.08 m)
Shipping Length	14.9 ft.-178.86 in. (4.54 m)
Weight	335 lbs. (152 kg)
Maximum Logging Speed	30 ft./min (9 m/min)
Caliper	4.5 in.-17 in.
Measuring Range	1.3-3.0 g/cc
Repeatability	Den : ±0.015 g/cc (from 2 to 3 g/cc) Pe: ±0.2 B/e (absence of mudcake)
Absolute Accuracy	Den: ±0.025 gm/cc (2.0 to 3.0 g/cc) Pe: ±0.2 B/e (13 to 60 B/e) Caliper:±0.30 in. (76mm) from 4.5 to 1.7 in.
Depth of Investigation	8.0 in. (203.2 mm)
Vertical Resolution	19.0 in. (482.6 mm) given proper formation contrast above and belowzone of interest
LS Measure Point	1.19 m from bottom of mandrel
SS Measure Point	1.02 m from bottom of mandrel
Wireline Requirements	7-Conductor Cable
Operating Voltage & Current	180 Vac, 120 mA
Detector or Sensor Type	Scintillation
Source Type	Cs 137
Strength	2.5 Curies
H2S Qualified	Yes
Maximum Tensile Load	49,000 lbs. (22,226 kg) with pad retracted
Maximum Tension Force	44,500 lbs. (20,185 kg)
Maximum Compression Force	All MGTS tools

Acoustic Tool (ACT)

Geo-Vista

Applications

- Compressional slowness Dt
- Cement Bond Logging (CBL) and Variable density logging (VDL)



Introduction

Acoustic Tool is a logging device which evaluates the formation properties and estimates formation parameters by measuring the sonic wave propagations in earth formations. It can effectively obtain the array signals of compressional waves, shear waves and Stonley waves in formation ranging from soft sandstone to low porosity hard rocks, thus it provide new measure for determining geological parameters such as porosity, permeability and rock mechanical properties, analyzing lithology, identifying fractures. This tool can also run for Cement Bond Logging (CBL), providing information for cement bond quality evaluation.

ACT tool have update section from ACT-EC, which was electronic part that make ACT tool overcome harsh environment and working long life.

Specifications

Electronics	
Maximum Temperature	400°F (200°C) ＞8 hours
Maximum Pressure	23,000 psi (160 MPa)
Instrument Length:	7 ft.-9.8 in. (2.38 m)
Instrument Diameter:	3.625 in. (92 mm)
Hole Deviation	Vertical to Horizontal
Wireline Requirements:	7-Conductor Cable
Operating Power:	180 Vac 150 mA
Instrument Weight:	130 lbs. (59 kg), Estimated
Maximum Tension Force	60,000 lbs. (27,000 kg)
Maximum Compression Force	60,000 lbs. (27,000 kg)
Mandrel	
Maximum Temperature	375°F (190°C) ＞ 8 hours
Maximum Pressure	23,000 psi (160 MPa)
Minimum Hole Size	4.50 in. (114 mm)
Instrument Diameter	
Electronics	3.625 in. (92 mm)
Mandrel	3.625 in. (92 mm)
Makeup Length	20.0 ft.-6.9 in. (6.26 m)
Electronics	7 ft.-9.8 in. (2.38 m)
Mandrel	12 ft.-9.1 in. (3.89 m)
Total Weight	336 lbs. (153 kg)
Electronics	130 lbs. (59 kg)
Mandrel	200 lbs. (91 kg)
Logging Speed	60 ft./min (18 m/min) max.
Absolute Accuracy	+/-0.5 us
Repeatability	+/-1 %
Vertical Resolution	0.5 ft. (15.24 cm) Basic measurement
Power Requirements	
Logging	180 Vac @ 120 mA
Wireline Requirements	7-Conductor Cable
Maximum Tensile Force	17,000 lbs.
Maximum Compression Force	4,000 lbs.
Type	Piezoelectric (monopole)
Bandwidth	Wideband (1-25 kHz)
Number	4
Spacing	6.0 in. (152 mm)
Offset	3.0 ft. (0.914 m) min. / 6.5 ft. (1.98 m) max.
Transmitter(s)	
Type	Piezoelectric (monopole)
Bandwidth	Broadband (2-18 kHz)
Number	2
Spacing	2 ft. (0.6 m)

Multipole Array Acoustic Tool (MAA-H)

Geo-Vista

Applications

- Petrophysical evaluation
  Porosity estimation (also in cased hole)
  Lithology and clay identification
  Gas identification
- Sonic imaging
- Rock mechanical properties
- Anisotropy analysis
- Thin bed analysis
- Fracture monitoring with Gyro in cased hole
- Cement Bond Log (CBL)

Features

- Acquires all waveforms simultaneously
- High power broadband dipole transmitters with superior low-frequency content
- Provides high-quality shear data that eliminates the need for dispersion correction

Introduction

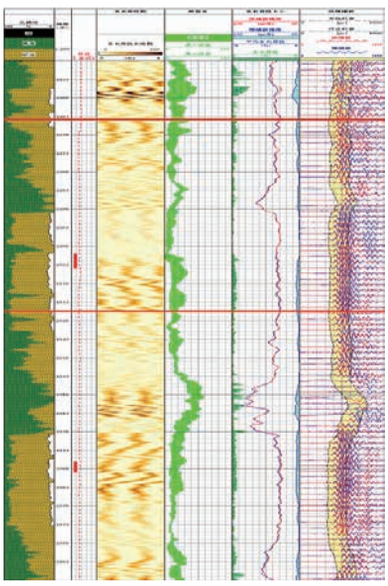
Multipole Array Acoustic Tool (MAA-H) is a fullwave monopole, quadrupole and cross dipole acoustic logging tool. MAA cross multipole array acoustic log service acquires full-wave acoustic data for compressional, shear and Stoneley evaluations. The significant design improvements have resulted in a broader range of capabilities. And it incorporates the simultaneous acquisition of twodirectional dipole measurements aligned 90 degrees apart in the wellbore.
MAA contains five major components: ACT-EC, MAA-H-MB, MAA-PB, MAA-BA and MAA-H-FA.

Specifications

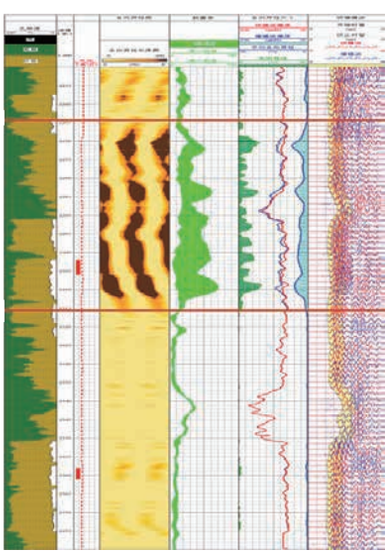
Maximum Temperature	400°F(200°C)
Maximum Pressure	23,000 psi (160 MPa)
Make-up Length	37 ft.-5.64 in. (11.42 m)
Total Weight	780 lbs. (354.1 kg)
Instrument Borhole Diameter	3.88 in. (98.6 mm)
Minimum Borhole Diameter	4.5 in. (114 mm)
Maximum Borehole Diameter	17.5 in. (455 mm)
Borehole Deviation	Vertical to Horizontal
Telemetry	Standard MGTS
Mode:	
Command	Mode 2
Tool Status	Mode 2
Data	Mappable: mode 7 or 5
Data Transmission Time:	
Subset 1	1.7 s (Inline & Cross dipole, fullwave mono, Mono DT-44 channel acquisition)
Subset 2	0.86 (Inline dipole, Fullwave Monopole, Mono DT)
Sample Rate:	2 samples per foot recommended
Maximum Logging Speed (Standalone):	
Recommended Subset 1	15 ft./min (Inline & Cross dipole, fullwave mono, Mono DT-44 channel acquisition)
Recommended Subset 1	28 ft./min (Inline dipole, Fullwave Monopole, Mono DT-compressed 20 channels)
Depth Control	Relative instrument depth control to an accuracy of 12 in.
Data Recorded	Monopole-Fullwave (range 40-300 us/ft.) Dipole-Fullwave (range 80-1000 us/ft.) Quadrupole-Fullwave (range 80-TBD us/ft.) Stoneley-Fullwave (range 180-600 us/ft.) Mono DT-From monopole Cross Dipole-Fullwave (same depth)

Multipole Array Acoustic Tool (MAA-H)

Geo-Vista



Before fracturing



After fracturing

Specifications

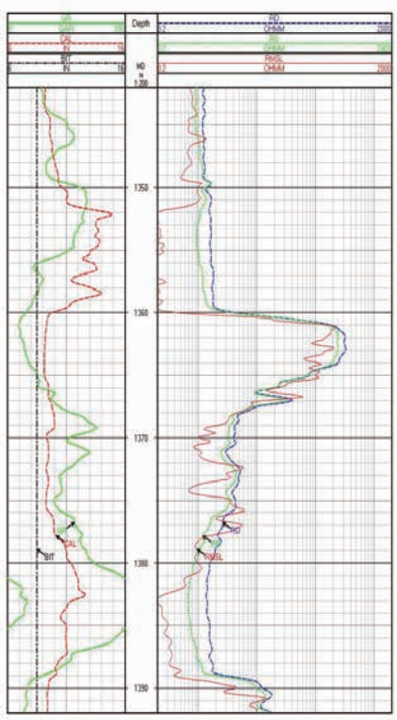
Data Presented	
Mono DT (Methods–First break, Avan real time)	
Vertical resolution (Semblance)	3.5 ft.
Vertical Resolution (First Break)	1.0 ft.
Measurement Range:	
Clompressional Slowness	40-280 usec/ft.
Shear Slowness	80-1000 usec/ft.
Stoneley Slowness	80-1000 usec/ft.
A/D conversion Rate	5 usec to 250 usec
Number of A/D Channels	8
A/D Resolution	16 bits
Record Length	3125 samples max.
Compaction/Compression	12 bit compation & data compression
Measurement Accuracy:	
	+3% error on compressional slowness
	+5% error on shear slowness
	+5% error on Stoneley slowness
Total Power	MGTS Instrument Bus
	AC power (180 Vac)<300 mA
Accuracy	±3% error on compressional velocity
	±5% error on measured shear velocity
Vertical Resolution	3.5 ft. for semblance. 0.5 ft. for inner Rx first break and monoΔT.
Maximum Tensile Force	
Transmitter & Receiver	35,000 lbs.
Isolator	45,000 lbs.
Maximum Compressive Force	
Transmitter & Receiver	35,000 lbs.
Isolator	45,000 lbs.
Absolute Bending Strength of Mandrel	2000 ft./lbs.

Dual Lateralog Tool-Slim Hostile (DLT-SH)

Geo-Vista

Applications

- Rt determination in conductive mud.
- Evaluate the water saturation.



Introduction

The DLT-SH tool measures formation resistivity and is designed primarily for use in boreholes filled with highly conductive drilling fluids. DLT-SH provides two resistivity measurements: a Shallow reading to investigate the formation near the borehole and a Deep reading to measure farther out where the formation is less disturbed by drilling fluids. These two readings are used to estimate the amount of hydrocarbon in a formation and the ease of recovering that hydrocarbon.

Specifications

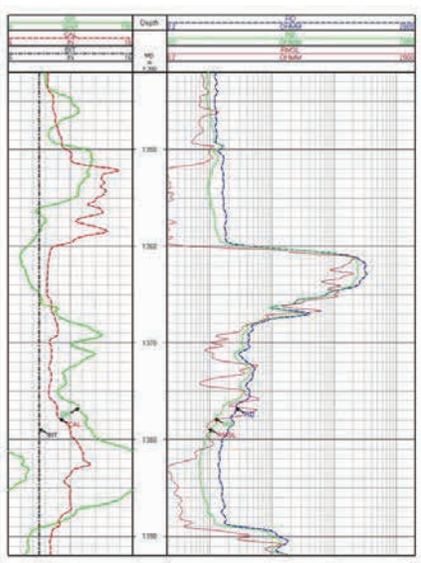
Maximum Temperature	430°F (220°C) 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
	30,000 psi (206.9 MPa) Advanced
Tool Diameter	2.875 in. (73 mm)
	3.125 in. (79 mm) Advanced
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Make-up Length: (Electronics & Mandrel only)	
	22 ft.-1.37 in. (6.74 m)
EA	10 ft.-2.84 in. (3.12 m)
MA	11 ft.-10.73 in. (3.63 m)
Shipping Length:	
Electronics	11 ft.-5.8 in. (3.5 m)
Mandrel	13 ft.-1.68 in. (4.01 m)
Weight:	
Electronics	118.6 lbs. (53.8 kg)
Mandrel	129.8 lbs.（58.9 kg)
Maximum Tensile Force	42,000 lbs.
Maximum Compressive Force	7,400 lbs.
Detector or Sensor Type	Electrode Array (Mandrel & Instrument Housings)
Maximum Logging Speed	60 ft./min (18.3 m/min)
Measurement Range	0.2 to 40,000 ohm·m
Mud Type/Range	Water based mud 0.015 ohm·m to 3.0 ohm·m
Accuracy	from 0.2 to 2000 ohm·m Greater of ±5% or 0.06 S-m; from>2000 to 40000 ohm·m Greater of ±5% or 0.025 S-m
Stability (at Max. Temp.)	5% of computed readings (with tool calibrated for internal CAL, ZERO after achieving and maintaining the maximum temperature)
Vertical Resolution	2 ft. (0.61 m), given proper formation contrasts above and below zone of interest
Radius of Investigation	Deep Standard Return Mode 55 in. (1.397 m) Shallow Standard 18 in. (0.457 m)
Measure Point	6 ft.-0.83 in. (1.85m) above matching point of black block of DLT-S.
Power Requirements	180 Vac/90 mA-120 mA
Wireline Requirements	7-Conductor Cable

Micro Spherical Focused Laterolog Tool-Slim Hostile (MSF-SH)

Geo-Vista

Applications

- Measure the flushed zone resisitivity
- Combination with dual laterolog tool, got deep, medium and shallow resistivity curve.
- Provide a basis for formation evaluation



Introduction

The maximum diameter of MSF-SH is 92 mm, suitable for 4.5 in. borehole. MSF-SH is applicable to medium-deep well logging with water-based mud (fresh water or brine), sand shale or limestone. In combination with dual laterolog, MSF-SH can effectively judge the oil, gas and water-bearing properties of formations.

MSF-SH measures more accurate flush zone resistivity (Rxo) with less mud cake and formation resistivity affect.

Specifications

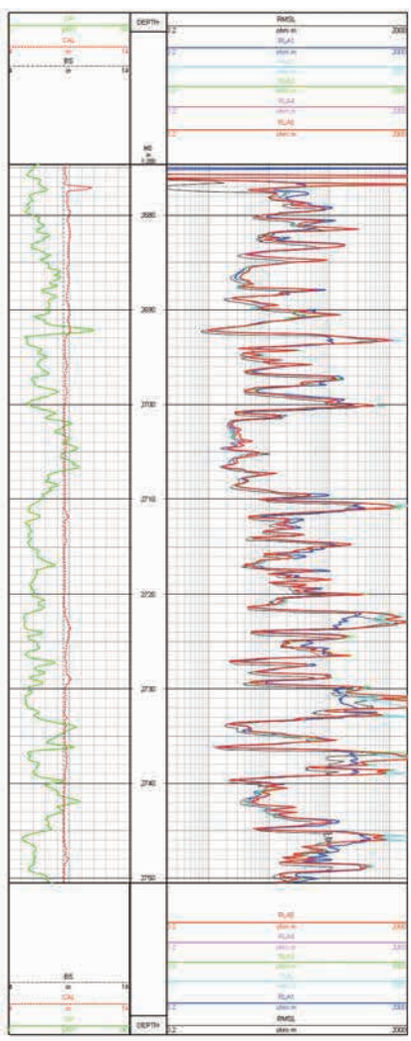
Maximum Temperature	430°F (220°C) 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.875 in. (73 mm)/ 3.625 in. (92 mm) at pad
Minimum Hole Diameter	4 in. (101.6 mm)
Maximum Hole Diameter	16 in. (406 mm)
Make-up length	14 ft.-1.45 in. (4.30 m)
MSF-SH-EA	7 ft.-5.93 in. (2.28 m)
MSF-SH-MA	6 ft.-7.54 in. (2.02 m)
Shipping length:	
MSF-SH-EA	8 ft.-8.88 in. (2.66 m)
MSF-SH-MA	7 ft.-1.84 in. (2.18 m)
Weight:	
MSF-SH-EA	92.6 lbs. (42 kg)
MSF-SH-MA	94.4 lbs. (42.8 kg)
Maximum Logging Speed	60 ft./min (18 m/min)
Operating Voltage & Current:	
	180 Vac/35-40mA at cablehead
Rx0 record range	0.2~2000 ohm·m
Rx0 measuring accuracy:	
	±1% with the range of 0.2 ohm·m-2 ohm·m
	±5% within the range of 2 ohm·m-200 ohm·m
	±10% or 5 mS/m within the range of 200 ohm·m-1000 ohm·m
Caliper range	4 in.~16.54 in. (101 mm-420 mm)
Caliper accuracy	± 5% within the range of 101 mm-420 mm
Vertical resolution	200 mm
Depth of investigation	3.94 in.~5.9 in. (100 mm~150 mm)
Stability	≤10% drift within continuous four working hours of the tool
Detector or Sensor Type	Pad

High-Resolution Array Laterolog Tool (ALT-H)

Geo-Vista

Applications

- Rt determination in conductive mud systems
- Thin-bed evaluation
- Invasion characterization for permeability indication
- Rt measurements free of Groningen effects
- Water saturation determination
- Identification of fluid contacts



Introduction

The ALT-H provides five independent, actively focused, depth and resolution matched measurements that can resolve the true formation resistivity in thinly bedded and deeply invaded formations. Unprecedented combinability results from the through-wired tool design. The absence of a current return at surface as well as no required use of a bridle greatly improves wellsite efficiency.

Specifications

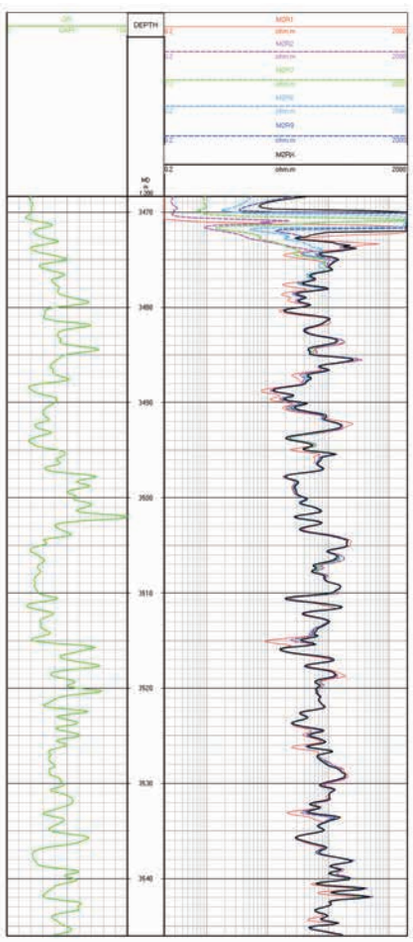
Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Minimum Hole Diameter	≥5 in. (4-3/4 in.under certain bore hole conditions)
Maximum Hole Diameter	16 in. (≤12 in.preferred)
Tool Diameter	3.625 in. (92 mm)
Make-up Length	24 ft.-1.2 in. (7.34 m)
Shipping Length	25 ft. (7.62 m)
Weight	394 lbs. (179 kg)
Maximum Logging Speed	60 ft./min (18 m/min)
Resistivity Range (Rm=1)	0.2 to 100,000 ohm·m
Resistivity Range (Rm=0.02)	0.2 to 20,000 ohm·m
Accuracy	±0.1 ohm·m @ 0.2~1 ohm·m ±5% @ 1~10,000 ohm·m ±20% @ 10,000~40,000 ohm·m
Vertical Resolution	12 in. (30.48 cm)
Depth of Investigation	RLA1: 12.60 in. (32 cm) RLA2: 15.35 in. (39 cm) RLA3: 18.90 in. (48 cm) RLA4: 25.20 in. (64 cm) RLA5: 55.12 in. (140 cm)
Maximum Tensile Force	30,000 lbs.
Maximum Compressive Force	With fin standoff: 3600 lbs. With rigid centralizers: 7800 lbs.

Array Induction Tool (AIT)

Geo-Vista

Applications

- Open hole formation conductivity
- SP measurements
- Determination of Rt
- Invasion profiling
- Hydrocarbon identification



Introduction

The Array Induction Tool (AIT) uses multi-spacing and multi-frequency measurements to acquire a complete set of data from the formations surrounding the borehole. The multi-spacing measurements allow improved conductivity measurements in complex environments. The short-spacing measurements (as short as 6 in. spacing) allow improved correction for borehole, rugosity and invasion effects. The long-spacing measurements (up to 94 in. spacing) are useful in deep invasion situations. The multiple-frequency measurements allow for an improved skin-effect correction and data quality checking. AIT allows us to characterize invasion profiles, even in oil-based muds.

Specifications

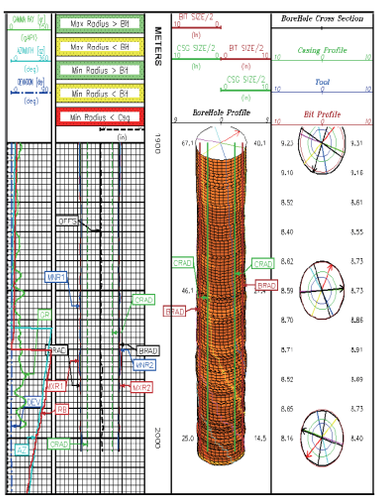
Maximum Temperature	400°F (200°C) ＞ 8 hours
Maximum Pressure	23,000 psi (160 MPa)
Instrument Lengths:	
Mandrel (make-up length)	19 ft. 9.9 in. (6.04 m.)
Electronics (make-up length)	7 ft. 3.7 in. (2.23 m.)
Total (make-up length)	27 ft. 1.6 in. (8.27 m.)
Instrument Weight:	
Mandrel	282 lbs. (127.9 kg)
Electronics	151 lbs. (68.5 kg)
Total	433 lbs. (196.4 kg)
Instrument Diameter	3.75 in. (95 mm)
Logging speed:	
Recommended	30 ft./min
Maximum	60 ft./min at 4 samples per foot
	100 ft./min at 2 samples per foot
Focussed conductivities:	
Depths of investigation	10, 20, 30, 60, 90, 120in.
Apparent vertical resolution	True or matched to 2 or 4 ft.
Measurement Range:	0.1 to 2000 ohm·m
Measurement Accuracy (homogenous formations):	
60, 90, 120 in. depth of investigation	±1 mS/m, ±2% of reading
30 in. depth of investigation	±2 mS/m, ±2% of reading
20 in. depth of investigation	±4 mS/m, ±2% of reading
10 in. depth of investigation	±10 mS/m, ±2% of reading
Borehole Properties	
6 in. hole Rt/Rm	< 7000
8 in. hole Rt/Rm	< 2000
12 in. hole Rt/Rm	< 1000
Hole Size	4.5 in. to 20 in.
Hole Deviation	Vertical to Horizontal
Minimum Radius of Curvature	24 ft. (7.30m)
Maximum Tensile Force	50,000 lbs. (22,500 kg)
Maximum Compressive Force	6500 lbs. (2925 kg) (14 in. hole)
	7600 lbs. (3420 kg) (12-1/4 in. hole)
	12800 lbs. (5760 kg) (8 in. hole)
Wireline Requirements	7-Conductor Cable
Calibration Environment:	10 feet off ground
	30 feet from metallic materials

Hexapod Arms Caliper-Hostile (HAC-H)

Geo-Vista

Applications

- Calculate the amount of cement
- Six independent Caliper
- Borehole geometry
- Environmental correction to log output



Introduction

HAC-H provides six independent radius caliper with high temperature and high pressure. It is a necessarily engineering logging tool and it also helpful for logging data environment process.

Specifications

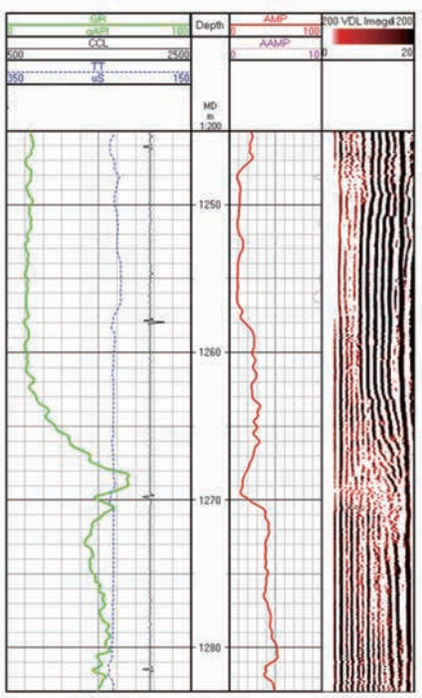
Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Length	11 ft.-1.2 in. (3.38 m)
Weight	242.5 lbs. (110.0 kg)
Diameter	3.625 in. (92 mm)
Arms	6 independent
Calipers	6 independent readings
Target Borehole Diameter	5-7/8 to 14 in. (Decentered)
	5-7/8 to 21 in. (Centered)
Hole Deviation	Vertical to Horizontal
Caliper Range	4.5 in. to 21 in. (114-533 mm)
Caliper Measurement Accuracy	0.2 in. (5 mm)
Wireline Requirement	7-Conductor Cable
Operating Power	180 Vac, 50-60 Hz
Motor Power	115 Vdc 1.0 Amps (At cablehead)

Casing Collar Locator (CCL)

Geo-Vista

Applications

- Depth control
- Location of casing damage



Introduction

The Casing Collar Locator can be used as a correlation device for depth control purposes and to locate and record the position of down hole equipment, such as DV Tools and Liner tops that may be present in the well. The CCL log can be very useful as a permanent record of the position of down hole equipment. The CCL must be positioned above the telemetry sub.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Maximum OD	3.375 in. (86 mm)
Makeup Length	27.56 in. (0.70 m)
Shipping Length	44.09 in. (1.12 m)
Weight	35.1 lbs. (15.9 kg)
Shipping Weight	44.1 lbs. (20 kg)
Principle	Magnetic Flux Change
Radial Resolution	360°

Electric Decentralizer Sub-Hostile (EDS-H)

Geo-Vista

Applications

- Instead the bow spring device for CNT instrument

Benefits

- Compared with the conventional bow spring device, EDS is more safety

Introduction

The Electric Decentralizer Sub is offer decenter of CNT tool. This is an electric decentralizer that uses motor control, pad force can be adjustable during the logging, the tool maximum OD is 3.625 in. (92 mm) when the pad was closed, which makes higher safety operation for the tool string during run in small hostile borehole.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Tool Diameter	3.625 in. (92 mm)
Minimum Hole Diameter	4 in. (101.6 mm)
Maximum Hole Diameter	21 in. (533.4 mm)
Make-up Length	8 ft.-10.3 in. (2.7 m)
Shipping Length	10 ft.-4.8 in. (3.17 m)
Weight	150 lbs. (68.0 kg)
Maximum Logging Speed	60 ft./min (18 m/min)
Measuring Range.	152.4 mm-533.4 mm (6 in.-21 in.)
Vertical Resolution	<2 mm (0.08 in.)
Maximum Tension Force	68,000 lbs.
Maximum Compression Force	64,000 lbs.
Maximum Pad Force	270 N
Caliper function is optional *	

Decentralizer Sub (DCS)

Geo-Vista

Applications

- Instead the bow spring device for CNT instrument

Benefits

- Work for long time under high temperature environment

Introduction

The Decentralizer Sub is an inline decentralizer that is mechanical type , the maximum OD is less than 92 mm when the bow spring was compressed, which makes higher safety operation for the tool string during run in small size borehole and capable to work for long time under high temperature environment without being affected by temperature.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Tool Diameter	3.625 in. (92 mm)
Minimum Hole Diameter	4.5 in. (114.3 mm)
Maximum Hole Diameter	22.0 in. (558.8 mm)
Make-up Length	6 ft.-10.08 in. (2.09 m)
Shipping Length	8 ft.-1.05 in. (2.47 m)
Weight	112.2 lbs. (50.9 kg)
Maximum Tensile Force	49,000 lbs.
Maximum Compressive Force	44,500 lbs.

Swivel Sub (SWS)

Geo-Vista

Applications

- Avoid cable twisting and loosening
- Reveal different properties of the different portions of the tool string to rotate independently
- Unrestricted 360° rotation by means of an internal slip-ring assembly

Introduction

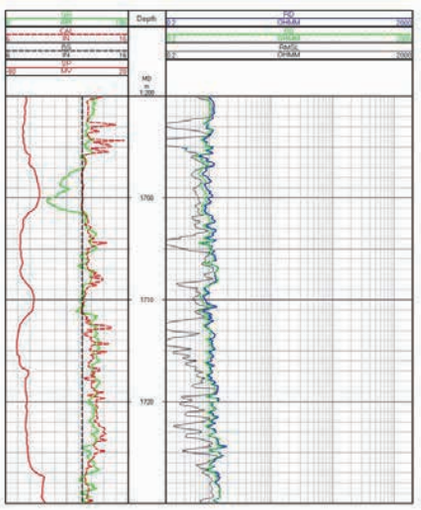
The SWS allows different portions of the tool string to rotate independently.It allows unrestricted 360° rotation by means of an internal slip-ring assembly.A swivel isolates an instrument from the normal torque induced as the spiral-wound wireline is lowered into and pulled out of the well. This torque causes the tool string to rotate slowly-typically one or two rotations per 100 ft. (30 m) of depth for a seasoned line. Typically, this rotation does not cause any problems.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Make-up length	3 ft.-4.0 in. (1.02 m)
Shipping length	4 ft.-3.0 in. (1.30 m)
Make-up Weight	68 lbs. (30.8 kg)
Shipping Weight	80 lbs. (36.3 kg)
Number of Conductors	10
Diameter	3.375 in. (86 mm)
Maximum Tensile Force	37,000 lbs. (16,780 kg)
Maximum Compressive Force	78,000 lbs. (35,374 kg)

Mass Isolator Sub (MIS)

Geo-Vista



Introduction

The Mass Isolator Sub is designed to meet field demand for a high mechanical strength mass isolator to be used in conventional and pipe conveyed logging applications. The pressure housing is comprised of a metal substructure with an outer layer of fiberglass insulation material. Electrical mass isolation occurs in a specially designed bottom sub. The MIS should typically be located in the tool string below the cablehead. Two MIS are combined together to provide the necessary 24 ft. length of electrical isolation required by deep laterologs to separate the wireline armor from the logging tool string housings.

The 1 in. electrode of the lower MIS serves as an SP sub and remote electrode for the micro resistivity services.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Makeup Length	12 ft. (3.66 m)
Shipping Length	13 ft.-5 in. (3.97 m)
Weight	185 lbs. (84 kg)
Diameter	3.63 in. (92.20 mm)
Top	28-Pin
Bottom	28-Pin
Feed through wires Teflon	22 AWG 600 Volt
Wireline Requirements	7-Conductor Cable
Operating Power	N/A
Operating Position	Any
Hole Deviation	Vertical to Horizontal
Maximum Borehole Curvature	10 degree/100 ft.
Maximum Tensile Force	40,000 lbs.
Maximum Load Force	
8 in. diameter borehole	40,000 lbs.
12 in. diameter borehole	29,200 lbs.
14 in. diameter borehole	18,800 lbs.
Isolation	>5 Mohms-500 Vdc (at rated temperature)

Four Arms Centralizer Sub (FCS)

Geo-Vista

Applications

- Centralize the downhole tools

Introduction

The Four Arms Centralizer Sub is inline centralizer. This tool use 32-pin connector to connect. It uses the spring plate to support on the well wall. The spring plate can freely extend or withdraw with the well diameter changing, that it makes the tool string center in borehole.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Tool Diameter (max)	15.0 in. (381.0 mm)
Make-up Length	4 ft.-1.4 in. (1.25 m)
Shipping Length	5 ft.-6.3 in. (1.68 m)
Weight	83 lbs. (37.65 kg)
Minimum Hole Diameter	4.50 in. (114.3 mm)
Maximum Hole Diameter	16.0 in. (406.4 mm)
Tool Diameter (min)	3.375 in. (86 mm)
Maximum Tensile Force	78,000 lbs. (35,380 kg)
Maximum Compressive Force	37,000 lbs. (16,780 kg)

Single Knuckle Joint (SKJ)

Geo-Vista

Introduction

The Single Knuckle Joint used for the connection between the different tools. A single knuckle will provide a nominal 10°angular off-set; two knuckles used in tandem will permit the centralization of a string in. a 13.625 in diameter hole, while the adjacent tools are positioned against the bore hole wall.The application of the SKJ is suited for cased or open hole logging conditions. The Single Knuckle Joint can run with any MGTS tool.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Make-up Length	2 ft.-3.9 in. (0.71 m)
Shipping Length	3 ft.-8.8 in. (1.14 m)
Weight	48.5 lbs. (22 kg)
Tool Diameter	3.375 in. (86 mm)
Minimum Hole Diameter	4.75 in. (120.7 mm)
Maximum Hole Diameter	Two knuckles in tandem will provide off-set for centralization in a 13-5/8 in. hole.
Maximum Tensile Force	32,000 lbs. (14500 kg)
Maximum Compressive Force	5,000 lbs. (2268 kg) For two knuckles in tandem at 10°.
Maximum Deflection Angle	10° Nominal per knuckle joint.

Double Knuckle Joint (DKJ)

Geo-Vista

Introduction

Double Knuckle Joint used for the connection between the different tools. A Double Knuckle will provide a nominal 12° angular off-set in a 13.625 in. diameter hole, while the adjacent tool are positioned against the hole wall. The application of the DKJ is suited for cased or open hole logging conditions. The Double Knuckle Joint can run with any MGTS tool.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Make-up Length	4 ft.-7.8 in. (1.42 m)
Shipping Length	6 ft.-0.7 in. (1.85 m)
Weight	106 lbs. (48 kg)
Tool Diameter	3.375 in. (86 mm)
Minimum Hole Diameter	4.38 in. (111 mm)
Maximum Hole Diameter	Provide offset for centralization in a 13-5/8 in. hole
Maximum Tensile Force	30,000 lbs. (13,600 kg)
Maximum Compressive Force	5,000 lbs. (2268 kg) at 10° deflection
Maximum Deflection Angle	12° Nominal per Knuckle Joint

Flex Joint Sub (FJS)

Geo-Vista

Introduction

The Flex Joint Sub can be generated when bent in any direction, thereby enabling the tool string in the well move freely. Flexible section is installed in the tool string in the middle or other corresponding place. Both play the role of a mechanical connection between the two ends of the instrument, while both ends of a standard 32-pin plug and socket electrical connection is completed, both ends of the instrument command and data signals unobstructed.

Specifications

Maximum Temperature	400°F (200°C)
Maximum Pressure	23,000 psi (160 MPa)
Make-up Length	3 ft.-6.13 in. (1.07 m)
Shipping Length	5 ft.-0.63 in. (1.54 m)
Weight	54.5 lbs. (25 kg)
Tool Diameter	3.375 in. (86 mm)
Minimum Hole Diameter	4.75 in. (120.7 mm)
Maximum Hole Diameter	Two FJS in tandem provide off-set for centralization in a 13-5/8 in. hole.
Maximum Tensile Force	32,000 lbs. (14500 kg)
Maximum Compressive Force	5,000 lbs. (2268 kg)
Maximum Deflection Angle	12° Nominal per knuckle joint

Insulation Sub-Slim Hostile (ISS-SH)

Geo-Vista

Applications

- Limit the length of the reflow electrode

Introduction

The ISS-SH is designed to meet field demand for a high mechanical strength mass isolator to be used in conventional and pipe conveyed logging applications. The pressure housing is comprised of a metal substructure with an outer layer of fiberglass insulation material. Electrical mass isolation occurs in a specially designed bottom sub. The ISS-SH should typically be located in the tool string upper the Dual Lateralog Tool-Slim Electronics and below the Micro Spherical Focused Laterolog Tool-Slim electronics.

Specifications

Maximum Temperature	430°F (220°C)
Maximum Pressure	29,000 psi (200 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Make-up length	1 ft.-8.76 in. (0.53 m)
Shipping length	3 ft.-1.2 in. (0.95 m)
Weight	30.42 lbs. (13.8 kg)
Maximum Tensile Force	50,000 lbs.
Maximum Compressive Force	50,000 lbs.

Hole Finder Sub (HFS)

Geo-Vista

Applications

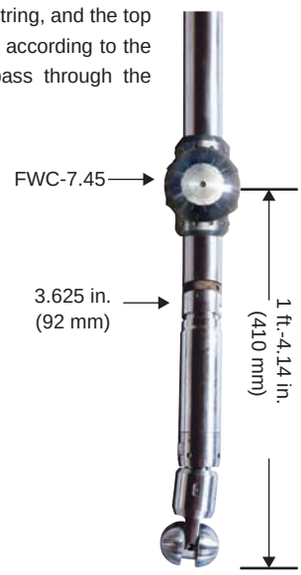
- Open hole and cased hole wireline operations, particularly stationary formation tester operations
- High deviations and horizontal wells using alternative conveyance such as pipe or tractor
- Complex well trajectories wells
- Washed-out and rugose hole profiles

Introduction

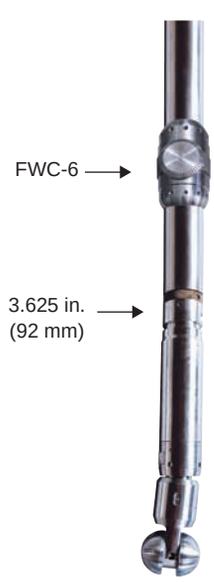
The Hole finder Sub (HFS) is flexibly connected to the instrument string, and the top wheel prevents the top from dying on the well wall. It can be bent according to the wellbore trajectory, guiding the instrument string to smoothly pass through the expansion section.

Specifications

Length	1 ft.-4.14 in. (410 mm)
HFS-7.45:	
Tool Diameter	7.8 in. (198 mm)
Minimum Hole Diameter	8.5 in. (216 mm)
HFS-6:	
Tool Diameter	5.79 in. (147 mm)
Minimum Hole Diameter	6 in. (152 mm)



HFS-7.45



HFS-6

Flywheels Centralizer Sub (FWC)

Geo-Vista

Applications

- For highly deviated well or horizontal well

Introduction

Flywheels Centralizer Sub is frequently added to a toolstring to eliminate or mitigate the risks that jeopardize safe and fast wireline interventions in modern complex wells.

These devices are clamped on at multtiple points along the toolstring body their inclusion reduces the surface area in contact with the wellbore and friction forces acting on the toolstring.

Specifications

FWC-6:

Shipping Length	8.17 in. (207.5 mm)
Weight	16.75 lbs. (7.6 kg)
Tool Diameter	5.79 in. (147 mm)
Minimum Hole Diameter	6 in. (152 mm)
Maximum Hole Diameter	7.4 in. (188 mm)

FWC-7.45:

Shipping Length	8.17 in. (207.5 mm)
Weight	36.1 lbs. (16.4 kg)
Tool Diameter	7.8 in. (198 mm)
Minimum Hole Diameter	8.5 in. (216 mm)
Maximum Hole Diameter	28 in. (711 mm)

Pipe Conveyed Logging Tool-B (PCL-B)

The Pipe Conveyed Logging Tool-B (PCL-B) is used to provide assurance that the logging tools will be able to successfully survey the intended interval of the wellbore.

Logging While Fishing (LWF)

- Get logging data under bad borehole situation during the fishing operation.
- Conventional operation on the wellsite like PCL (Pipe Conveyed Logging).
- Only need side-entry sub, torpedo & fishing equipment.
- Saves logging data after fishing operation.
- Provides a different logging choice under bad borehole situation.
- Saves drilling time.

Pipe Conveyed Logging Tool-H (PCL-H)

Pipe convey logging system used in horizontal wells and the difficulty logging equipment, which can at high temperature, high pressure, high conductivity mud media of downhole to achieve the docking cable and instruments , the system can remain unchanged in the conventional logging projects The premise and guarantee the quality of measurement tasks to complete, it can be coring, repeat formation test, dip logging, perforating and so on. Using this system can not only measured by conventional logging the best information, but can also be micro-resistivity scanning operations. In the course of a logging operation, can measure all standard measurements, with significant economic benefits.

Coiled Tubing Logging (CTL)

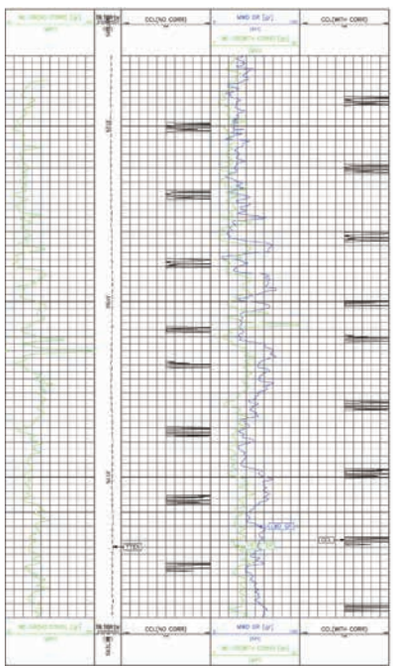
We provide Coiled Tubing Logging (CTL) service. And manufacture adaptor from GVT cablehead and coiled tubing. It can help us connect GVT downhole tool with coiled tubing.
Also, we supply the depth measurement equipment for coiled tubing.

Shock Gamma Ray Tool-1 (SGR-1)

Geo-Vista

Applications

- Depth measurement by CCL and Gamma Ray for perforating operation



Introduction

The SGR-1 is used with wire line perforating guns when very accurate depth control is required. The Gamma/CCL tool is physically attached to the top of a perforating gun after taking the measurement of distance from the ccl to the Gamma Ray measure point and the distance to the top shot in the gun. The assembly is then run into the well. After proper depth has been verified, the Gamma/Gun assembly is positioned opposite the zone to be perforated, and the gun may be fired with the Gamma Ray tool still on the line. Safety is achieved by normally powering the tool on a positive current and then switching to a negative current to fire the gun. A special safety firing circuit prevents the gun from being fired with the Positive polarity current. Different models of the tool may feature either a Scintillation detector or a Geiger Mueller detector with a special shock mounting designed to withstand the blast and shock of the perforator.

Specifications

Maximum Temperature	350°F (175°C) for 20 hours
Maximum Pressure	18,000 Psi (124 MPa)
Tool Diameter	1.69 in. (43 mm)
Minimum Hole Diameter	2.5 in. (63.5 mm)
Make-up Length	7 ft.-9.94 in. (2.386 m)
Shipping Length	8 ft.-9.75 in. (2.686 m)
Weight	42 lbs. (19.1 kg)
Recommended Logging Speed	20 ft./min (6 m/min)
Maximum Logging Speed	30 ft./min (9 m/min)
Curves Recorded	Gamma Ray/
Sensitivity Approximately	1.3 counts/API unit
Operating Voltage / Current	85 Vdc at 45 mA at cable head
Detector Type	0.84 in. X 6 in. Scintillation
Cable Type	Single Conductor
Accuracy	Uncalibrated correlation device only
Stability	+/-15% of count rate over full temperature range
Shock	>1000 g
Depth of Investigation	12.0 in. (304.8 mm) estimated for a 7.88 in. (200.2 mm) water-filled borehole
Vertical Resolution	8.00 in. (203.2mm) given proper formation contrast
Measure Point (GR)	18 in. (457.2 mm) from bottom sub
Measure Point (CCL)	60 in. (1524 mm) from bottom sub
Line Utilization	GR & CCL: 1 & Armor
H_2S Qualified	No
Measure Point:	
Shock Sub Bottom to GR Detector Center	2 ft.-11.92 in. (0.912 m)
Shock Sub Bottom to CCL Coil Center	6 ft.-6.72 in. (2.000 m)
GR Detector Center to CCL Coil Center	3 ft.-6.84 in. (1.088 m)

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